

# CURRICULUM ALIGNMENT

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## 2010-2011 Report



CENTRAL FLORIDA  
DISTRICT SCHOOLS

*Presented by*

## UCF Regional Campuses & UCF Undergraduate Studies

Central Florida Regional  
Curriculum Alignment Conference

October 28, 2011

Valencia College Criminal Justice Institute

# Goals for Curriculum Alignment

*From the 1<sup>st</sup> Annual Curriculum Alignment Conference  
October 27, 2010*

## **Biology**

- Improve biology lab skills for entering freshman.
- Standardize HS biology curriculum beginning with labs.
- Improve pedagogical and content knowledge of MS/HS teachers.
- Increase ongoing support from CC/Univ to MS/HS.
- Improve general college readiness of HS Students.

## **Chemistry**

- Academic transition readiness - Students will be prepared to enter the next level of the chemistry curriculum
- Students will demonstrate mastery of core concepts and skills, eg. scientific method, experimental design, data collection and analysis, results communication (written and verbal), inquiry labs are a tool for accomplishing this
- Students will demonstrate strong problem solving and critical thinking skills and scientific curiosity
- Students will have established successful learning strategies including basic study, note taking, and time management skills
- Establish and maintain a supportive communication, resource network, and meeting schedule for K-16 and industry

## **Math**

- Continue and initiate more dialogue between high school and college levels.
- Provide constant communication of course descriptions and ongoing assessments between levels.
- Discuss and align placement process from secondary to post secondary (6-20).
- Develop a consistent alignment of concepts taught and tools used in the K- 20 levels.
- Share data to modify instruction to achieve desired learning outcomes.

## **Physics**

- Develop a Lab Curriculum/List of Suggestions
- Clear communication between K-12 , colleges, and FDOE
- Improve Public Relations
- Implement STEM Competition (JETS, Physics Olympiad) hosted by the regional college
- Align physics curriculum (middle school – college)

## **CURRICULUM ALIGNMENT: COMPUTER PROGRAMMING**

### **October 2010**

Beginning October 2010, a working group of computer programming faculty met to begin to align selected topics in computer programming courses, share best practices and evaluate assessment tools.

### **December 2010**

A select group of faculty met to align several of the COP courses in programming. The group started with aligning introduction to programming (COP1000 at most schools) and then moved to Java programming courses. The group agreed to meet in the spring to discuss advanced Java courses and database management.

### **April 2011**

At this meeting, database courses (CGS 2540/2545, COP2700, etc.) were examined and aligned. The group also completed the alignment of advanced java and shared best practices. The group agreed to meet in the Fall to examine other courses that are needed to be aligned in web programming and development.

### **October 2011**

At this meeting there was lots of discussion on the difference between Web Applications and Web Programming (COP2822 and COP2830). The group thought that it might make more sense to make sure a student has XHTML exposure before they take a programming or scripting course. The group agreed to do some homework on what content should be in each course and may be a point of discussion at the October 28 conference.

## **CURRICULUM ALIGNMENT: BIOLOGY**

### **May 2009**

A Working Group comprised of the Chief Academic Officers from UCF's six partner colleges and key UCF administrators met and selected Chemistry as the second subject to work on common course alignment. The primary objective is to improve student success for transferring students.

### **October 2009**

A core group of faculty representing Brevard Community College, Central Florida Community College, Daytona State College, Lake-Sumter Community College, Seminole Community College, Valencia Community College and UCF met and selected Biology I and II to compare and discuss ways to align curriculum between and among the seven institutions. In addition, best practices and various teaching aides were shared among the participants.

### **November 2009**

Biology faculty from all seven institutions met for a half-day workshop to compare curriculum for the two biology courses, and to share best practices, teaching aides and assessment tools. They agreed to meet again in April 2010 to continue alignment in anatomy and physiology and a more in depth discussion regarding assessment of learning outcomes, share more best practices and proven learning techniques in the classroom.

### **April 2010**

Biology faculty discussed prerequisites for A&P I and II, and then spent time discussing Anatomy and Physiology 1 and 2 and decided on the major topics and sub-topics for each courses. Then the group discussed course issues, and challenges with students trying to get around course prerequisites. Lastly, the group discussed dissections and how schools were handling dissections for students and/or faculty who had objections.

### **October 2010**

The faculty in attendance had a discussion of transferability between the schools at the meeting. They then talked about UCF and its policy on accepting A&P I & II for Anatomy and Physiology, which is done for nursing students. Next, the group reviewed A&P I and II topics and subject areas. There was much discussion about where and how to include the endocrine system. It was decided to put it at the end of A&P I as a survey topic and then to include it throughout A&P II as appropriate. The group then spent a lot of time getting appropriate topics and subtopics on for microbiology. It was decided that this course did need a new column added to the spreadsheet on depth of coverage. Lastly, the group spent some time looking at prerequisites.

### **February 2011**

Faculty members were introduced to the UCF Office of Pre-Professional Advising with Dr. Bernard Mackey presenting and offering a Q & A. Dr. Mackey explained its primary purpose is to serve pre-professional students to increase their success. The office provides early assistance and advisement with

student academic preparation, course selection and career planning. Discussion of the five goals from the Curriculum Alignment Conference provided an opportunity to identify new tasks for the year. Dr. Mohtashem Samsam from the UCF Burnett School of Biomedical Sciences provided an overview of his role with the university while also echoing the discussion of how important aligning anatomy curriculum is. Dr. Samsam offered his continued assistance to the group.

### **September 2011**

Dr. Gary Sligh, Dean of General Education & Transfer Programs at Lake Sumter Community College and President, Association of Florida Colleges, welcomed the group to LSCC. Faculty members deferred the idea of working cross-disciplinary for now so as to continue refining their work together with district and postsecondary teachers. While the group believed that most of the work has been accomplished for identifying the lab skills necessary for freshman and standardizing high school biology curriculum with labs, more attention needs to be given to the final three goals. Further, there were concerns expressed that high school teachers are not able to cover the mandated map with current time schedules. The group addressed the gap between what K-12 goals/mandates dictate and what postsecondary institutions are expecting.

# Goals with Tasks

## Biology

### From Curriculum Alignment Conference October 27, 2010

1. Improve biology lab skills for entering freshman. Univ/CC give HS list of skills and concepts necessary for success at all levels of college biology as well as most problematic areas.
  2. Standardize HS biology curriculum beginning with labs. Univ/CC give HS suggested labs with different levels of inquiry. Univ/CC give a suggested lab write-up to area MS/HS faculty.
  3. Improve pedagogical and content knowledge of MS/HS teachers. Provide workshop training for HS faculty with continuing education credit. After attendance at college workshops, Univ/CC have prepared equipment lockers for use by MS/HS biology teachers.
  4. Increase ongoing support from CC/Univ to MS/HS. Distribution list of Univ/CC professors willing to be mentors to HS instructors.
  5. Improve general college readiness of HS Students.
- Goals for 1 Year
    - Seeing how a lab is done is critical.
    - CPalms (State office of math and science), add vetted best practices to the course descriptions already posted on website.
    - K-12 submit labs that they do for curriculum alignment process, submit these things to Barbara Hunnicutt. Meet in February on Fridays for a few hours.
    - Look at course standards, descriptions and appendix B and identify labs which meet more than one benchmark.
    - How are standards being placed into units? Everyone is making curriculum maps which place standards into different units.
    - Curriculum map comparison
    - Learning Focused Strategies (LFS) buy-in Sumter county, takes awhile for instructor buy-in. Seen success with the program, took 5 years.
    - Put pacing guides from each district on the curriculum alignment website, so everyone on the committee can look at them and comment.

- Method for Getting Started
  - Meet again before February? HS and SC/CC are talking different languages, what is it that HS are really wanting from SC/CC?
  - Standards can be interpreted in different ways.
  - 3 main reporting clusters that all the benchmarks are funneled into. Something for SC/CC to look at to understand what HS are responsible
  - Workshop mechanisms – offering on Saturdays? Where to offer.
  - When come together again-bring list of equipment that each school has available.
  - Mentor list-ask DCs to see if professors would be willing to serve as mentor to MS/HS faculty via email or face to face. Can teachers sit in on classes at the college level? With list, identify what classes and how many can come into class.
  - Match instructors who teach the same class. Possible webcam visit?
  - Identify potential hurdles to mentoring program.
  - Professors willing to come to high schools to reinforce what will happen at college level, identify this on the list.
- Skills for College Ready Students
  - [www.vark.com](http://www.vark.com)- identifies what kind of learner the student is.
  - Goal setting –want our students to set goals for themselves
  - Study skills
  - Time management
  - Passion for learning in general- active learner
  - Ability to learn is often what instructors want students to take with them
  - Effective Note-taking
  - Effective Writing Skills
  - Problem Solving – the study of science trains you to be a better problem solver.
  - Risk Taking Ability

# **Biology Curriculum Alignment**

## **Meeting Minutes**

**February 18, 2011**

**Valencia Community College  
Lake Nona Campus**

**Post-Secondary In Attendance:** J Bottesch (Brevard CC); Karen Champ (College of Central Florida); Walter Saviuk (Daytona State); Debby Carter Hicks, Steve Clark (Lake Sumter CC); Maggie Klingele, Kim Maznicki, Ameer Mehta, Laila Nimri, Uma Singh (Seminole State); Bernard Mackey, Mohtashem Samsam, Craig Tidwell, Laurence von Kalm, Michele Yeargain (UCF); Flora Chisholm, Candy Cravaritis, Kris Dougherty, Lynn Dorn, Melissa Schreiber, Brenda Schumpert (Valencia).

**Secondary In Attendance:** Debbie Ziebart (Lake County); Valeria Rivera (Osceola County); Eileen Roach (Seminole County); Karen Ray, Danielle Sanders (Sumter County); Isabel McLaughlin, Jennifer Taylor, Susan Zona (Volusia County);

### **Welcome and Introductions**

- Started meeting at 10:00am
- Each faculty member introduced themselves and their areas of teaching expertise
- Briefly discussed the purpose of curriculum alignment and the work done to date in all areas

Welcomed Dr. Bernard Mackey from the UCF Office of Pre-Professional Advising. Dr. Mackey discussed his role and the role of his office (OPPA).

- The primary responsibility is to increase student success of pre-professional students
- Advise students on what they need to do to establish themselves well as they pursue a professional career
- Will help students do mock interviews, etc.
- Many students want to enter the health professionals
- Goal is to see them early, and help them see where they fit best

Next, Dr. Mackey fielded questions from the group:

- Q1: Will UCF send delegates to community and state college campuses?
- A1: Yes, UCF can do that in a coordinated manner. They have been to several outreach events and fairs.



- Q2: How early do you want to see students?
- A2: First year, freshmen; as early as possible
- Q3: Will UCF visit high schools?
- A3: Harder to coordinate with High Schools, can yes it is possible.
- Q4: What are the top 3 things UCF looks for when selecting pre-professional students?
- A4: Admissions looks at requirements. Chemistry is requiring a CPT of all students wanting to enter the major.
- Q5: Do you know the success and retention of students in the pre-professional programs?
- A5: UCF is working on a database to track student success
- Q6: What instruments does UCF use to determine if the students are in the correct program?
- A6: Course curriculum history; service done; etc.
- Q7: Does UCF provide job shadowing and internships/coops for students?
- A7: This is handled through the Career Services and Experiencing Learning center, located on the main campus.
- Q8: Should the student take their lab courses at the university rather than the community college and/or state college?
- A8: Dr. Mackey provided a handout of recommended courses to take and where (General Biology 1 and 2, gen chemistry 1 and 2, and college mathematics Cal 1 and 2 or statistics can be taken at the community/state college; organic chemistry 1 and 2, and general physics 1 and 2 should be taken at the University).

Dr. Mackey said that there will be a deficit of approximately 125,000 general practitioners in the U.S. He also stated that medical school is very competitive and the number of students entering medical school is not keeping up with the need/demand for physicians

#### **Reviewed the minutes of the last meeting and A&P I and II**

- A&P – it was mentioned that the endocrine system needs to move from A&P I to A&P II; but this needs to be discussed further before making this change since there was not agreement.
- Valencia changed some of their prereqs based on the last meeting discussions
- End-of-Course exams will officially start next year at the high schools

#### **Discussed Five Goals from Curriculum Alignment Meeting from October 27, 2010**

Goal 1: Improve biology lab skills for entering freshmen.

- Need to improve critical thinking skills. Students need to learn how to draw their own conclusions from data – not just do pre-scripted labs that tell them exactly what to do.

- Money/funding is an issue as labs are expensive
- Standard format – lab reports etc.
  - Lab write up standards
  - Every lab – calculation skills, critical thinking skills, and articulation skills.
  - Training on the labs – teachers need training
  - Need a minimum set of labs that should be done
- Ability to write up labs – lab notebooks
  - Introduction
  - Hypothesis
  - Lab details
  - Conclusions
- Critical thinking skills
- Articulation skills – verbally and written
- Computational skills
  - Scientific notation
  - Graphing; reading and interpreting
  - Spatial analysis
- Measurement skills – metric system
- Basic biological lab skills
  - Equipment identification and proper usage
- Proper lab attire – no open toed shoes, etc.
- Lab safety awareness
  - Proper disposal
  - Proper use of PPE
- Hypothesis testing and development
- Difference between an independent and dependent variable
- **What labs should every high school student go through before they enter college?**
  - Enzyme lab
  - pH lab – effectiveness of antacids
  - Application of the metric system
  - Evolution lab
  - Plant labs – biodiversity
  - Diffusion and osmosis
  - Determination of an unknown
  - Dissection lab
  - Genetics and DNA
  - Microscope lab – mitosis (count number of cells)
  - Baby lab
  - Environmental (ecology)
- Problematic areas in labs:
  - Students can't do lab report properly
  - Students are weak in basic lab skills

- Students can't do basic math, have poor writing skills, don't know such basic concepts at pH scale and elements
- Students don't come to class properly attired
- Schools need to enforce science fair – students should do a science project (requirement)
- Students don't take ownership
- Use labs that focus on critical thinking skills:
  - Application of plant labs
  - Paige Keeley has some good labs – visit <http://mmsa.org/> for more information
- The University of Arizona has good online labs – mitosis lab online (good pre-lab). Also check out [www.biologycorner.com](http://www.biologycorner.com) as they have good online lessons
- Next, **Dr. Mohtashem Samsam, from the Burnett School of Biomedical Sciences at UCF talked about his role at the university. His contact information is [msamsam@mai.ucf.edu](mailto:msamsam@mai.ucf.edu) or 407-823-4810.**
  - He talked about anatomy – should be in the same level and direction at all of the schools (aligned); applied anatomy makes the course more interesting
  - He offered to be of assistance to the group

### Conclusion and Next Steps

- Next meeting location to be determined (possibly LSCC) on September 16, 2011
- High School and Middle School teachers need contacts at the colleges in their area.
  - Professional development would be helpful for teachers
  - Mentoring between high school and college

### Biology Curriculum Alignment Website

- The website is located at <http://www.curriculumalignment.ucf.edu> click on the Biology link then the login link (drop down will appear)
- Your user name and password is your email address (all lower case)
- Your password is your first initial + last name + ! (so Jill Smith would be jsmith!)

# **Biology Curriculum Alignment**

## **Meeting Minutes**

**Friday September 16, 2011 10am-2pm**

### **Lake Sumter Community College**

**In Attendance:** Bertha Freeman (College of Central Florida); Debby Carter Hicks, Steve Clark, Jennifer Cerione, Jennifer Fewster, Matt Wood, Nancy Browne, Chris Leibner (Lake Sumter Community College); Barbara Hunnicutt-Greenwell, Kim Maznicki (Seminole State College); Kris Dougherty, Lynn Dorn, Francie Chu, Brenda Schumpert (Valencia College); Karen Ray (Sumter County); Mike Hampton, Pam Cavanaugh (UCF)

#### **I. Welcome, Introductions & Intention of Meeting**

- Meeting started at 10:10 am
- Mike Hampton welcomed everyone and Debby Carter Hicks turned it over to Dr. Gary Sligh, Dean of General Education & Transfer Programs at Lake Sumter Community College and President, Association of Florida Colleges, who welcomed the group for the meeting on the campus.
- Participants introduced themselves.
- Agenda for the day was presented.
- Mike Hampton announced that he and a team of faculty have submitted a proposal to the DOE for teacher training.
- The idea of escalating our intent to do cross-disciplinary curriculum planning at the conference was discussed. It was suggested to keep to our alignment timeline as work together with district and postsecondary teachers needs to continue.

#### **II. Review of Past Meeting Minutes**

- Minutes from 2-18-11 were reviewed. The only modification was to delete the “baby lab” under the types of labs suggested for college bound high school students since it really is a type of lab included in the “Genetics and DNA” lab.

#### **III. Develop Report for Conference, October 28, 2011**

- Discussion pursued on how to proceed with completion of addressing the alignment goals and with preparing a report for the conference. The group agreed that the first 2 goals have been addressed and concentration should be on the remaining goals.
- Biology Curriculum Alignment Goals
  - Improve biology lab skills for entering freshman.
  - Standardize HS biology curriculum beginning with labs.
  - Improve pedagogical and content knowledge of MS/HS teachers.
  - Increase ongoing support from CC/Univ to MS/HS.
  - Improve general college readiness of HS Students.

- High school input is necessary for this group to proceed with these goals. High school pressure with end of course testing mandated by state is affecting classroom teaching.
- Mike offered that the Council for Undergraduate Research has valuable resources on the value of research in addition to traditional and mandated curriculum.
- An idea of teaming partners of high school teachers with college faculty/instructors to offer extracurricular opportunities at the colleges for students to get the research/lab/hands-on experience might be an opportunity to work around the classroom limitations with such mandates.
- There was general agreement that the decision makers, including legislators, need to hear these issues and how their decisions affect such curriculum matters.
- Mike mentioned that he has been working with a team to affect change for Chemistry AP and the review has resulted in modifications in the curriculum.
- Concerns were expressed that high school teachers are not able to cover the mandated map with current time schedules.
- With a gap between what K-12 goals/mandates dictate and postsecondary expectations, the group looked at the state mandates of content areas for instruction and reviewed each content area from a postsecondary view to gauge whether a lab was critical/suggested/field project necessary; the content area might need de-emphasized; and whether the content area might need to be removed. A chart was developed to reflect this work (attached).
- Additional reference material regarding the same can be found at [www.floridastandards.org](http://www.floridastandards.org).

**Break:** Lunch was provided and a tour of the new Science & Math building was conducted by the faculty members from Lake Sumter Community College

**IV. High School and Middle School teachers need contacts at the colleges in their areas.**

- Defer this content area until conference.

**V. Curriculum Alignment Conference, October 28, VCC Criminal Justice Institute (9-4)**

- It was confirmed that a similar agenda to the first conference was effective and would benefit all. An annual report of accomplishments will be prepared and circulated for input and confirmation to be used at the CAC.
- Barbara agreed to serve as the facilitator of the small group sessions for Biology.

**VI. Conclusion**

- Next steps to accomplish goals
  - While curriculum alignment is being done it was determined that an action plan needs to be determined on identifying what needs to be facilitated.
- Next meeting date and location
  - February 17, 2012 at Seminole State College; Kim Maznicki will serve as contact person.

### Partnership Review of Mandated High School Biology Curriculum

<b>Cognitive Area</b>	<b>Content D= Deemphasize R=Removal</b>	<b>Lab M=Mandatory S=Suggested E=Experiential</b>	<b>Type of lab</b>
What is Science?			
Practice of Science			
Data Collection & Analysis		M	metric systems, operation skills, basic lab equipment, graphs
Principles of Ecology		E	
Energy in an Ecosystem & Biogeochemical Cycles	D/R		
Changes in an Ecosystem	D/R		
Human Impact on the Environment			
Properties of Water	D	M	pH
Macromolecules & Enzymes		M	environmental effects, pH substrate concentration, T, unknown determination
Cell Theory	D		
Cell Structure & Function		M	microscopy
Cell Membrane & Transport		M	diffusion, osmosis
Photosynthesis & Cellular Respiration		M	carbon dioxide indicator
Cell Cycle & Mitosis & Meiosis		M	microscopy
DNA Replication, Protein Synthesis & Meiosis v. Mitosis			
Mendelian Genetics		S	taster lab, gender, human phenotypes
Human Genetics	D		
Origins of Life & Natural Selection		M	Natural selection process
Evidence of Evolution			
Mechanisms of Change & Primate Evolution			
Taxonomy	D		
Plants		M	Biodiversity
Growth & Fetal Development	D	M	Actual Dissection not virtual
Human Health	D		
STEM Or Transition to Chemistry Or Forensics Or TBA			

## **CURRICULUM ALIGNMENT: CHEMISTRY**

### **May 2007**

A Working Group comprised of the Chief Academic Officers from UCF's six partner colleges and key UCF administrators met and selected Chemistry as the second subject to work on common course alignment. The primary objective is to improve student success for transferring students.

### **October 2007**

A core group of faculty representing Brevard Community College, Central Florida Community College, Daytona State College, Lake-Sumter Community College, Seminole Community College, Valencia Community College and UCF met and selected CHM1025, 1032, 2045 and 2046 to compare and discuss ways to align curriculum between and among the seven institutions. In addition, best practices and various teaching aides were shared among the participants.

### **January 2008**

Nearly 20 chemistry faculty from all seven institutions met for a half-day workshop to compare curriculum for the four chemistry courses, review student success rates, and share best practices, teaching aides and assessment tools. They agreed to meet again in September 2008 to continue a more in depth discussion regarding assessment of learning outcomes, review syllabi for each course, discuss how to integrate lectures and labs, share more best practices and proven learning techniques in the classroom, and discuss placement tests.

### **September 2008**

The next workshop was held on September 26, 2008 at Brevard Community College to discuss the learning outcomes for CHM 2045 and 2046, and to agree on common topics for Organic Chemistry I and II. The group agreed to learning topics for the courses and discussed student performance challenges and what skills are needed to be successful in these courses.

### **February 2009**

The next meeting was held February 6, 2009 at Daytona State College. The group discussed placement exams, and agreed to come up with a pilot placement exam for fall 2010. The group also discussed learning outcomes and best practices for Chemistry I and II. The next workshop is planned for September, 2009 and will focus on curriculum alignment for Organic Chemistry and on sharing further best practices.

### **October 2009**

The group started off with a discussion of a Chemistry Placement/Assessment Test Discussion. A VCC faculty presented her results of placement test for students taking chemistry courses from the spring 09, and summer 09 semesters from several of her chemistry courses, utilizing the UCF chemistry assessment exam for her results (30 questions). UCF found that the students were able to do the math on the chemistry placement exam, just not able to do the math when embedded in a word problem. Next, Organic Chemistry I course content was discussed and outlined. Lastly, the group discussed best practices for chemistry.

**February 2010**

Valencia hosted this meeting. Reviewed a pilot study being done on chemistry and a strong correlation between student success and scores on the exam was found. The group then discussed the idea of a shared placement exam, and it was decided that it would be best if each institution did this on their own to provide a higher level of institutionalization. Discussed supplemental instruction and what the colleges are doing in this area. Next, a discussion was held on student success issues and discussed use of the Ohio State site as a method for supplemental instruction. Several web sites are available and can be used as a source for students who need additional assistance with a given topic. Completed the General Chemistry I and II course content chart. Lastly, reviewed Organic Chemistry I and worked on Organic Chemistry II.

**September 2010**

This meeting was held at UCF. Time was spent time discussing supplemental instruction (SI) and the possibility of grant funded opportunities. The faculty discussed the usage of online text materials. Next they discussed an apparent disconnect for some students between Chem I and Chem II. They appear to do a brain dump between courses so they may do well in a prerequisite course but not the follow-up course. A review of Organic Chemistry I and II was done next followed by lab techniques.

**February 2011**

This meeting was held at Seminole State College. The group discussed the way courses are aligned and the use of the acronyms M for Mandatory, O for Optional, V for Overview and R for Review. A professor discussed her pre-testing of students in some of her classes and the results of her pre-testing and intervention. Next, the group discussed the five goals from Curriculum Alignment conference. Next, the group talked about what is needed by all chemistry students at the high school level. Best practices and deficiencies were discussed, and lastly what college faculty thought high school students needed to know to be successful in college chemistry.

**September 2011**

Discussion of Chemistry I alignment with post-secondary CHM x045 produced opportunities to examine prerequisites, college level readiness, assessment, and student motivation issues. Labs used at the college level and best practices on lab content/ equipment were discussed. Additional alignment issues such as cross curriculum planning and discussion, middle school involvement, prerequisites, and excess hours problems were identified. There was interest in going back to respective sites to look at data on Math performance in the last finished class compared with Chemistry class grades. The group wants to meet at the same time as the Math group to do some cross-disciplinary work.



# Goals with Tasks

## Chemistry

### From Curriculum Alignment Conference

### October 27, 2010

- **Academic transition readiness** - Students will be prepared to enter the next level of the chemistry curriculum
  - Identify which HS courses feed into which college courses (Feb)
  - Share course syllabi and entry skills/competencies for college courses( Feb)
  - Correlate benchmarks in HS curriculum to requirements in college (Oct)
  - Share assessment strategies, learning tools, rigor expectations(Oct)
- **Students will demonstrate mastery of core concepts and skills**, eg. scientific method, experimental design, data collection and analysis, results communication (written and verbal), inquiry labs are a tool for accomplishing this
  - Identify core concepts and skills (Feb)
  - Assemble relevant labs, exercises, technologies, etc .on website and correlate with core concepts and skills (Oct)
- **Students will demonstrate strong problem solving and critical thinking skills and scientific curiosity**
  - Identify deficiencies (Feb)
  - Devise a scaffolding progression plan for development of problem solving skills (Oct)
  - Identify and assemble problem solving techniques (eg estimating, calculators, etc) (Oct)
  - Assemble activities that encourage inquiry (eg .real world, demonstrations, linkages between disciplines, etc) (Oct)
- **Students will have established successful learning strategies including basic study, note taking, and time management skills**
  - Identify deficiencies(Feb)
  - Share best practices (Feb)
  - Pilot and evaluate selected trial strategies (Oct)
- **Establish and maintain a supportive communication, resource network, and meeting schedule for K-16 and industry**
  - Provide all members access to website (Oct. 27, 2010)
  - Add new resources to Curriculum Alignment website (Ongoing)
  - Record all teleconferences and place on website (Ongoing)
  - Expand meeting schedule as needed (ongoing)
  - Add inventory of resources (Ongoing)
- Other
  - Find ways to engage students, eg inquiry labs
  - Find ways to make them question and think critically

- Correlate benchmarks in HS curriculum to requirements in college courses
- Identify fundamental skills needed at end of HS class to succeed in college chemistry
- Utilize real-world to motivate
- Need flexibility in curriculum to teach, esp lower level students and keep engaged
- Take same approach already started at college curriculum alignment and do at HS
- Spent some time deciding which HS students go into which college course
- Need to share course syllabi and entry skills/competencies for college courses
- What happens to students who are found not to be ready for next level?
- Develop ways to identify areas of weakness and provide interventions
- Students learn very differently now. Information readily available making memorization and retention “less critical”
- Availability of technology is an issue, should something be done to make more available?
- In HS labs are a real issue both on basis of time, chemicals, and equipment
- College lab experiences
- Community labs – central facilities for students of all levels, available for scheduling
- Developing problem solving skills critical
- Have regular conferences, record teleconferences for those who cannot attend

# Chemistry Curriculum Alignment

## Meeting Notes

February 4, 2011

10am-2pm, Seminole State College

### Present:

**Post-Secondary - BCC** – Tatiana Zuvich; **LSCC** - Steve Husebye; **Seminole** – Stephen Summers; **UCF** - Donovan Dixon, Michael Hampton, Helen Hill, Craig Tidwell; **Valencia-** Melody Boeringer, Daeri Tenery;

**Secondary - Lake County** - Nichole Moses; **Orange County** - Madeline Lopez; **Seminole County** - Chris Dalland, Bridget Walters; **Sumter County** - Deanna Squire; **Villages Charter Schools** – Bridget Logan; **Volusia County** - Jeremy Brock, Robert Hernandez, Erica Saylor;.

### I. Introduction and Overview

- Meeting started at 10:15am. Welcomed the faculty to the workshop and covered the purpose of the meetings to the participants.
- Faculty introduced themselves and shared where they teach and classes in chemistry that they teach.
- Provided a brief overview of Curriculum Alignment for the K-12 faculty in attendance.

### II. Review of Past Meeting.

- Reviewed minutes from Sep 2010 meeting.
- Discussed the way courses are aligned and the use of the acronyms M for Mandatory, O for Optional, V for Overview and R for Review.
- Melody Boeringer discussed her pre-testing of students in some of her classes at Valencia and the results of her pre-testing and intervention.

### III. Five Goals from Curriculum Alignment Conference.

- Mike Hampton reviewed the five goals that were developed at the Oct 27 Curriculum Alignment Conference.
  1. Academic transition readiness - Students will be prepared to enter the next level of the chemistry curriculum
  2. Students will demonstrate mastery of core concepts and skills, e.g. scientific method, experimental design, data collection and analysis, results communication (written and verbal), inquiry labs are a tool for accomplishing this
  3. Students will demonstrate strong problem solving and critical thinking skills and scientific curiosity
  4. Students will have established successful learning strategies including basic study, note taking, and time management skills

5. Establish and maintain a supportive communication, resource network, and meeting schedule for K-16 and industry
- He then opened the floor to discussion of each goal and task.
    - There was discussion of when chemistry is taught at the secondary level. Some students take in 10<sup>th</sup>, 11<sup>th</sup>, or even 12<sup>th</sup> grades.
    - Secondary schools teach chemistry and AP chemistry after chemistry.
      - If a student scores a 5 on the AP exam, Valencia lets them skip Chem I and II.
      - AP and IB count as Chem I and II at the state level.
    - What are the secondary schools teaching?
      - Chem I (regular and honors)
      - Chem II (honors)
      - IB students take chemistry and organic chemistry
    - Put syllabi on the web site (<http://www.curriculumalignment.ucf.edu>) from K-12 school systems.
    - Need to look at consistency in the AP courses between schools
    - Need to identify core concepts and skills – focus at next meeting.
      - There was discussion on inquiry based labs – need to discuss best practices.

**The question was raised “What is needed by all chemistry students at the high school level?”**

- Problem solving skills
- Math skills
  - Algebraic skills
  - Dimensional analysis
- Chemistry core concepts
  - Atomic theory
  - Basic nuclear
    - Balance equations
    - Fusion and Fission
  - Periodic table
    - Recognizing trends
    - Electronic configuration
    - Transition and non-transition elements
  - Writing and Balancing equations
    - Molecular
  - Predicting products
  - Recognizing reaction types (chemical)
    - Redox (honors)
    - Acid base (some)
  - Bonding
    - VSEPR (honors yes; some in Chem I)

- Intra (and inter) molecular forces
- Three equation types
  - Molecular (general)
  - Net ionic (honors some in general)
  - Complete ionic (some general)
- Three formula types
- Lewis structure
- Stoichiometry
  - Empirical formula and molecular formula
  - Percent composition
  - Limiting reactant
- Gas laws
  - Ideal and combine
- Solution chemistry
  - Acid base
    - Simple titration
  - Concentration calculations
    - Molarity
- Reaction rates
  - Factors and effects
- Thermochemistry
  - Endo and exothermic
  - Calorimetry
  - Heating curves and phase change
- Equilibrium (basic overview)
- Next the group discussed labs and techniques.
  - Density inquiry lab (different beverages)
  - Lab equipment – includes glassware
  - Measurement – how to read, and selecting the appropriate tool
    - Accuracy vs. precision
    - Meniscus
  - Flame test
    - Bunsen burner
    - Glass bending
  - Titration – burette, gas collecting tube
    - Indicators
  - Reaction types
    - Precipitations
    - Single and double replacement
    - Activity series

- Molecular models
- Safety
- Hydrate lab
- Mixture Separation
- **Goal 4a, b) Deficiencies and Best Practices as it relates to successful student learning strategies were discussed next.**
  - **Best Practices:**
    - Interactive note book – journal of what they have learned all year.
    - 3 subject notebook
    - Help them organize their work – take notes, put in labs, worksheets, practice, foldables etc. in consecutive order.
    - Check every 2 weeks, and decrease as the year progresses
    - In place of a textbook – no textbook
    - Require mastery on any unit test
    - Must pass every test at 70% or better
    - Need to correct and explain what they missed
    - Can retake the test until they pass
    - Document problem solutions
    - First day – inform students of requirements to be successful in the course (how many outside hours for a class)
    - College skills for AP students
    - After doing a demonstration – talk about it, do a lab, etc.
    - Activity with the content
    - If a number is missing its units – call it naked
    - Connect the subject matter to real life
  - **Deficiencies:**
    - Students aren't putting in enough outside time to be successful
    - Math weakness
    - Critical thinking
    - Reading skills
    - Don't know how to problem solve
    - Decoding
    - Tenacity – many student lack
    - Test taking skills
    - Have problems prioritizing questions
    - Give up too quickly
    - Lack of motivation as it relates to relevance
    - Advising – students are put in the wrong course – don't have the correct skill set
    - Doing the minimum – just what is needed to pass
- Lastly, a couple of the secondary faculty asked what do college faculty want incoming freshmen to know to be successful in chemistry:

- Significant figures
- Dimensional analysis
- Representation of numbers in different notations
- Metric system of measurements
- Decoding word problem
- Basic balancing of equations
- Naming compounds
  - Basic naming of binary compounds
- Using units
- Trends in the periodic table
- Mole concept
- Electron configuration
  - How it relates to the periodic table
  - Atomic structure
- Lewis dot structures
- General math skills
  - Use of calculators
  - Proportions
  - Graphing
  - Scientific notation
- Tenacity – survival skill (not giving up)
- Teach them to ask for help

#### **IV. Next Steps**

- Next meeting – September 16, 2011. To be held at Valencia at their Criminal Justice Institute.
  - Continue to work on the five goals from the conference for next year's conference.
  - Work on aligning Chemistry I from secondary to post-secondary (CHM x045)
  - Look at what labs are used at the college, what a good chemistry lab should have
  - Look at labs – what do others do (best practices)

# Chemistry Curriculum Alignment

## Meeting Notes

September 23, 2011

10am-2pm, Valencia College

### Present:

**Post-Secondary - BCC** - Tatiana Zuvich, Christina Moisii; **LSCC** - Steve Husebye; **Seminole** - Stephen Summers, Van Quach; **UCF** - Michael Hampton, Helen Hill; **Valencia**- Melody Boeringer, Angelica Vagie, Tonguc Oztek.

**Secondary - Orange County** - Madeline Lopez, Candace Reim; **Seminole County** - Chris Dalland; **Sumter County** - Deanna Squire, Dennis Lippert; **Villages Charter Schools** - Bridget Logan; **Osceola County** - Michael Kesten.

### I. Introduction and overview

- Meeting was opened by Dr. Michael Hampton with thanks to Melody and Valencia College for hosting the meeting. Introductions followed.

### II. Review of past meeting

- Reviewed minutes from February 4 meeting.
- Reviewed five goals from previous meeting and academic transition issues between institutions.

### III. Chemistry I alignment with post-secondary CHM x045

- Discussion of Biology changes and what they have to do with Chemistry and how it is taught.
- Biology is bound by end of course exam required by state. Chemistry does not have this limitation.
- Discussion of necessary Chemistry skills followed by a discussion of next steps; without the end of course exam faculty can be more on target and give input to the state while being more flexible to meet concerns.
- Additional Chemistry issues were discussed:
  - Chemistry is not mandatory in HS currently and not always available. If new law is passed would require in 9<sup>th</sup> grade either Chem/Physics – General Chem “C” or better required - Brevard does not require a prerequisites for CHEM I – Daytona requires HS Chem with “C” or better or Intro to Chem at college level suggested that the student retake the intro to be current prior to going into chemistry
  - Committee would support recommendation that CHEM 1045 have a prerequisite of HS chemistry (strong recommendation) discussion around the research that showed upper 3<sup>rd</sup> (high grades in HS) passed others did not pass 1045
  - Discussed issues college student have with financial aid/excess hours when class is not passed
  - Pre-knowledge issues and how to determine readiness for college level Chem. How to determine student skills in chem area (Start Right initiative, Gateway test, pre assessment, review questions, chapter test, quiz cycle) 1/3 of the students don’t engage due to many issues one is large class size.



- What does the faculty do in the way of carrot or stick to motivate students?
  - a. Will not do extra credit-you should do it right the first time
  - b. Incentives such as fun labs-see how it works
  - c. Motivational speech to help focus the student
  - d. Do things like the name song to learn properties
- Would it help to offer classes in HS that were ½ and ½ such as Bio/Chem the time between when a student takes the class and when they get to college is often part of the problem
- Attitude of student plays a large part in their success when in the AP classes some are motivated while others are just looking for the grade. Many miss out on Chem because they are afraid of the math. HS requires 4 years of math but they do not always take the higher levels of math prior to taking the Chem
- Proven that the students with higher levels of math do better in the sciences and chemistry the website has syllabus available for review. Can post as well
- Skills needed – general problem solving skills, decoding skills-diagram sentences, lecture but also a place to show them how it works. Line graphs appear to be done in all areas and they must write sentences to explain what they did in order to understand why
- Strongly recommend they be able to do an analysis of line graph slope and intercept should include units since Math graphs differently so need to understand units
- Design of education compartmentalized to the extent that they cannot see the overlay between science and math
- Graduation requirements change for HS and Colleges changes the way things are taught
- Problem with assessment system
- Mind dump by students very real problem they do not tie one subject to the other
- Students do not understand that chemistry has a math foundation-again connections
- Do have differences between prerequisites for CHEM 1045 across schools- work on a support statement to recommend that they be the same
- Motivational issues need to be expanded into the Best Practices area of the website

#### **IV. Labs used at the college level and best practices on lab content and equipment**

- Discussion followed on lab needs that could be sent forward to Tallahassee as recommendations from the committee. Suggestion was made to carve some lab time from class time as free labs were hard to do. Module based systems were discussed.
- Resource center with experiential learning and best practices can be uploaded on [www.curriculumalignment.ucf.edu](http://www.curriculumalignment.ucf.edu)
- Issues with labs were discussed
  - Block schedule can design some labs-projects (5 on experience, 3 on paper) 45 minutes to 1 1/2 hour options
  - BCC students have no experience from HS when they get to college. Perhaps HS should be able to show the lab equipment even using picture
  - Equipment and time are big issues. Suggestions made include working in pairs and doing skills activities and rotating watchers/doers through group rotation.
  - Dual enrollment safety issue identified since students are not required to follow dress code (closed toed shoes), wet labs, goggles, etc

- What are students required to buy?
- Labs major techniques see last minutes (done at HS)
  - a. Needs: Molecular Model kits
  - b. Would like to see –energy lab (Calorimetry)/ unknown lab (doing now in some cases) full or partial.
- Question: Does the school have the equipment needed for labs?
- Electronic balances/glass tubes/cs84 probe kits/computers/calculator with adaptors

**V. Additional alignment issues that relate to where we go from here**

- Do we discuss colleges meeting Math/Science across curriculum discussion (no time during planning time)
- Upper level math – linked classes, team teaching
- Are we where we do meetings together? Start cross discipline functions, how math is used
- Additional people who need to be here – 8<sup>th</sup>/9<sup>th</sup> grade
- TOPIC: Learning Focus strategy – don't want to push down into middle school where they will be taking science to early, level of maturity of student
- Discussion on what the middle school faculty needs to teach –does it need to be geared toward honors? Must move math down as well to make it work - FCAT issues
- Home school issue – can be put anywhere in some schools – override issues keep them from being placed in some institutions, maturity issue
- Prerequisites /co-requisites MAC 1105 prior to CHEM I
  - Seminole State College – prerequisites - algebra only
  - Daytona State College – co-requisites of MAC 1105
  - Valencia College – prerequisites – college algebra (range of skill level)
- Excess hours problems, sequencing (how long can they stay to complete sequence), dual enrollment, legal issues, success issues (30% pass rate if co-requisites or lower in Chem)
- Study done at VC to determine variables based on last completed math class (Calculus/Pre-Calculus/Algebra/none large drop in success from calc to none)
- Biology – Chemistry- Physics conception/visual/maturity
- ACTION: gather data from your site and look at math vs. performance in last finished math class and chemistry class grades.

**VI. Conclusion and next steps**

- Goals – less time spent on 4 or 5
- Questions & Issues
  - Conversation concerning class size, core classes' size requirement is 24 but the AP class is an exception and is 35. This brings up several safety issues and HS group asked if the group can help with the safety of large labs. This becomes more important if they make Chemistry a 4-year requirement in HS.
  - The assessment issue came up with more teachers leaving the profession due to the way assessment will be done.
  - Standards are different between general classes and Honors classes where there is a different pass rate?

- Conference - follow same format as last year – morning, report out five goals; afternoon, action items and report to everyone what has been accomplished
- Melody was identified as the moderator and recorder will assist her
- **Next meeting – Feb. 24, 2012 – ask Math to join the meeting. Seminole State College offered to host the meeting.**

## **CURRICULUM ALIGNMENT: PHYSICS**

### **November 2008**

On November 7, 2008 faculty from the seven colleges (including UCF) met to discuss the need to align curriculum in physics. The group agreed that alignment was necessary and that meeting to discuss these issues would be a worthwhile process. The group agreed to focus on PHY 2053 and 2054; PHY 2048 and 2049 for the next meeting in April.

### **April 2009**

The next meeting was held on April 24, 2009 at UCF Regional Campuses. The main purpose for the meeting was to focus on aligning PHY 2053, 2054, 2048, and 2049. Also, the faculty agreed to discuss best practices and the general sharing of information between institutions. The group agreed to common learning topics for the four courses. The group agreed to meet again on October 23, 2009 to focus on learning outcomes for the courses, measuring student success, and sharing best practices.

### **October 2009**

Discussion took place on the correlation between the subject areas (chemistry, math and physics). Best practices are key to the curriculum alignment process. Word problems were discussed and the difficulty involved. Course Topics and identification of requirement for subject areas within the 4 core physics courses (048 and 049; 053 and 054) was done. Reviewed the core topics within the four courses – assigned M for mandatory, O for optional, R for review, and V for overview. There was considerable discussion on the topics and on where content was covered. Five major topics are covered in 053 and 054 (F=MA) - Forces, Fields, Energy, Waves, and Properties of matter. Discussed inviting a state rep to be involved in the next meeting, and discussed measurement of student success. Lastly, more best practices were shared among the group members.

### **March 2010**

This meeting, held at Valencia East, revolved around a conversation with the state DOE. Dr. Martin Balinsky from the Florida Department of Education in Tallahassee was called and the group discussed Modern Physics, and General Physics I and II. The group agreed to come up with a resolution in the future on moving Modern Physics from an upper division course to a lower division course. Lastly, the group discussed textbooks and which book was utilized by which school.

### **October 2010**

The most recent meeting was held at Valencia West in the physics lab. Much of the time was spent on how the lab is configured and managed. Faculty were given a tour of the facility and demonstrations of the various experiments that were set up in the lab. Valencia has a web site where lab information may be found at <http://science.valenciac.edu>. Lastly, the faculty discussed labs and most of the institutions create their own labs for their students.

### **February 2011**

The group started out with a discussion of Valencia's Physics web site, located at <http://science.valenciac.edu>. Next, the group reviewed the five goals from the October conference, particularly labs and lab topics, and equipment needed. The equipment list created was very comprehensive, and will be re-visited at the next meeting in October 2011.

**October 2011**

Discussion was focused on developing an “ideal lab” from the suggested lab equipment document William Stillwell prepared. The resultant list contains major lab equipment, less expensive lab equipment (less than \$250), demonstration equipment, and a consumable replacement line item. It was decided that the first two goals were accomplished and that more discussion was needed at the upcoming conference on how to address the remaining three goals.

# Goals with Tasks

## Physics

### From Curriculum Alignment Conference October 27, 2010

- **Develop a Lab Curriculum/List of Suggestions**
  - Develop list of suggested topics for labs
  - Develop list of lab data collection skills required for students entering college
  - Suggest lab report formats
  - Suggested analytical/data analysis skills (spreadsheets, graphing, etc)
  - Recommended equipment list
  - Share examples of experiments for various topics
  - Share virtual labs
- **Clear communication between K-12 , colleges, and FDOE**
  - Develop and share guidelines of college expectations with guidance counselors and school administration (including college admissions)
  - Encourage rigorous course selection to ease transition to college
  - Develop/suggest clear pre-requisites for high school physics
  - Establish network of central Florida region physics teachers (listserv, curriculum alignment website)
- **Improve Public Relations**
  - Emphasize how physics is authentic and real (applicable to everyday life)
  - Physics not just for physicists and engineers – ex. physics questions on MCAT, physics for video game design, etc
  - Encourage use of physics topics in other courses, interdisciplinary emphasis
  - Put up posters and flyers about physics in common areas (some available at APS.org and AAPT.org)
  - Familiarize people with impact physics has on ‘green’ technologies
- **Implement STEM Competition (JETS, Physics Olympiad) hosted by the regional college**
  - Plan on-site and/or online competitions
  - Research student prizes, teacher awards
  - List different existing competitions on website
- **Align physics curriculum (middle school – college)**
  - Participate in existing curriculum alignment meetings (Feb. 25, 2011)
  - Share exam questions and example problems
  - Publicize what credit or placement colleges/universities give for advanced physics courses
  - Share textbook information
  - Research how current K-12 standards compare to college course content and identify gaps

# Physics Curriculum Alignment

## Meeting Minutes

February 25, 2011

VCC West Campus

### Present:

**Post-Secondary:** Xiaodi Chen – BCC; Erika Kisvarsanyi – CCF; Victor Bondzie, William Stillwell, Irina Struganova – VCC ; Thomas Brueckner, Michael Hampton, Craig Tidwell – UCF.

**Secondary:** Shawn Price – Orange County; Doss Sowri – Osceola County; Angela Cortes, Janet Fox, Amber Morgan – Seminole County; Tricha Lewis – Villages Charter; Diane Sartore – Volusia County

- I. Meeting started at 10:10am
  - a. Group was welcomed and briefly discussed the history and purpose of curriculum alignment and the work that has been done to date.
  - b. Introductions – each member introduced themselves to the group.
- II. Review of Previous Meeting
  - a. Reviewed meeting minutes from Sep 2010 meeting
  - b. Refer to the following web site to see Valencia's physics lab setup (includes labs, demos, etc.) <http://science.valenciac.edu>
- III. Discussed 5 Goals from Curriculum Alignment Conference (Oct 27, 2010)
  - a. Develop a lab curriculum/suggestions
    - i. Opened floor to discussion.
      1. List of lab topics – what should students do or be able to do
      2. Stats is not required for lower level physics which can cause some issues
      3. Students need to be able to do statistical analysis and have the ability to analyze data
      4. Students need to be able to identify the data, what it is, etc. Students don't seem to understand the data
      5. Students need to understand the nature of an experiment.
      6. Every lab needs to utilize graphing and data analysis.
      7. Students need to be able to work in a group
      8. Labs should be inquiry based
      9. It would be nice to have a grading rubric posted for grading physics labs
  - b. List of topics to be covered for physics labs: Physics Topics & Labs
    - i. Skills and knowledge for ALL labs
      1. Use of instrumentation
      2. Precision of measurement
      3. Significant figures, units, etc.
      4. Statistical analysis of data
      5. Graphical analysis (best fit line, parabola, etc.)
      6. Organization and methods of data collection

7. Safety and etiquette
8. Proper handling of equipment and tools
9. Setting up and taking down (clean up)
10. Group interaction
11. Reading and following instructions
12. How to write a lab report (formal and informal)
13. Documenting and reporting experimental outcomes
- ii. Measurement and Vectors
  1. Density
    - a. Densities of various physical objects
    - b. Densities of liquids
    - c. 1d, 2d, and 3d densities
  2. Vectors
    - a. Force table
    - b. Orienteering
    - c. Static equilibrium
  3. Measuring PI
    - a. Toothpick simulation
    - b. Circle measurement
- iii. Motion (kinematics)
  1. Linear-1D
    - a. Free fall acceleration – ticker tape, ball toss, video analysis, egg drop, dropping washers with a microphone, picket fence
    - b. Horizontal – motion sensors, graph matching
    - c. Vertical
  2. Projectile (2D)
    - a. Launcher (spring loaded) – dart guns
    - b. Horizontal and angled launch
  3. Uniform circular
    - a. Centripetal acceleration
    - b. Whirlygig
- iv. Mechanics (dynamics)
  1. Newton's 1<sup>st</sup> law
    - a. Force table
    - b. Static equilibrium
    - c. Dynamic equilibrium
  2. Newton's 2<sup>nd</sup> law
    - a. Friction
    - b. Verification
    - c. Incline plane
    - d. 2 body problems
  3. Fluids
    - a. Archimedes principle
    - b. Pascal's principle
    - c. Bernoulli's principle
    - d. Capillary action



4. Linear momentum
  - a. Drop ball into sand – measures impulse momentum with crater
  - b. Egg drop (air bag)
  - c. Air hockey table – momentum measurement
5. Torque
  - a. Static equilibrium – meter stick and weights
  - b. Force sensor measuring door opening or other
  - c. Rotational inertia
- v. Energy and Conservation Laws
  1. Conservation of energy
    - a. Kinetic and potential energy
      - i. Carts on tracks with and without springs
      - ii. Roller coaster exercise
      - iii. Roll a ball down an incline
      - iv. Shoot for your grade
    - b. Work and power
      - i. Running up stairs (power in legs)
      - ii. Raising a mass (power in arms)
      - iii. Simple machines – levers, pulleys, incline plane, etc.
    - c. Conservation of linear momentum
      - i. Ballistics pendulum
      - ii. 2d collision with small ramps and balls
      - iii. Explosion with carts
    - d. Conservation of angular momentum
      - i. Spinning stool (arms in and out)
      - ii. Bicycle wheel
      - iii. Gyroscopes
- vi. Oscillations and Wave Motion
  1. Sound (speed, Doppler effect, resonance, etc.)
    - a. Resonance in an air column
    - b. Electronic tuners
    - c. Speed of sound using tubes and microphones
  2. Simple harmonic motion
    - a. Damping
    - b. Mass on a spring
    - c. Physical pendulum by Davey Jones
    - d. Simple pendulum
    - e. Bagels – eat the mass to see the change
  3. Wave characteristics
    - a. Wave form analysis
    - b. Waves on a string (standing waves)
      - i. Harmonics
    - c. Slinky – make the different wave forms
  4. Interference , super positioning principles
    - a. Speakers and a sound level meter
    - b. Beats with a tuning fork

vii. Thermal

5. Specific heat
6. Latent heat of fusion
7. Laws of thermodynamics
8. Ideal gas law
9. Heat engine
10. Absolute zero - extrapolation

vii. Electricity and Magnetism

1. Ohms law – resistor and light bulb and LED; resistivity of playdoh
2. Electrostatic charging
  - a. Faraday pail
  - b. Electroscopes – charging by friction, induction, etc.
  - c. Triboelectric series
  - d. Pith balls - charge
3. Circuits
  - a. Resistors and capacitors in series and parallel
  - b. Variable resistance
4. Capacitors
  - a. Parallel plates capacitors – variable geometry and introduction of dielectric material
5. RC Circuits
  - a. Charging and discharging
6. Magnetic fields
  - a. Mapping
  - b. Magnetic field of the earth
  - c. Electromagnets
  - d. Tangent galvanometer
7. Magnetic force
  - a. Force on a segment of a current carrying wire
8. Electric field mapping
9. Faraday's and Lenz's law
  - a. Solenoid/coil and a magnet with meters

viii. Optics

1. Reflection
  - a. Plane mirrors
  - b. Curved mirrors
2. Refraction (Snell's law)
  - a. Index of refraction of water and glass
3. Lenses and mirrors
  - a. Focal lengths
  - b. Magnification
  - c. Image characteristics
  - d. Instruments – microscopes, telescopes, etc.
  - e. Ray diagrams
4. Interference
  - a. Thin film

- b. Young's double slit
  - 5. Diffraction
    - a. Thickness of a hair
    - b. Diffraction grating
    - c. Reflection grating
    - d. Wavelength of light
    - e. Water – ripple tank
  - 6. Polarization
    - a. Brewster's angle
    - b. Polarizing filters
  - 7. Intensity of light – inverse square law
- x. Atomic and Nuclear
  - 1. Line spectra
    - a. Spectrum of hydrogen
    - b. Emission tubes – neon, nitrogen, hydrogen, etc.
  - 2. Photo electric effect (comes as a kit)
  - 3. Radioactive decay (half-life) (comes as a kit)
    - c. Pennies in a box
    - d. Thorium mantle – Coleman lantern filament
- c. Equipment list (wish list of ideally what should be in every physics lab):
  - 1. Stop watch
  - 2. Meter sticks
  - 3. Mass scales
  - 4. Multimeters – analog and digital
  - 5. Variable power supplies
  - 6. Lasers
  - 7. Function generator
  - 8. Circuit supplies – wires and alligator clips, resistors, capacitors, etc.
  - 9. Optics supplies -
  - 10. Air tracks and air supply (carts and additional accessories)
  - 11. Low-friction tracks (carts and additional accessories)
  - 12. Free-fall timer
  - 13. Ballistics pendulum
  - 14. Complete rotational dynamics kit
  - 15. Mass sets
  - 16. Force tables
  - 17. Computer interfaces and sensors
    - a. Motion sensors
    - b. Photogates
    - c. Force sensor
    - d. Temperature sensor
    - e. Microphones/sound sensors
    - f. Light sensors
    - g. Etc.
  - 18. Air columns
  - 19. Van de Graff
  - 20. Dissectible Leyden jar

21. Magnets
22. Compasses
23. Springs
24. Clear rulers and protractors
25. Calipers
26. Glass slabs
27. Magnifying glass
28. Clamps – right angle, and C
29. Ring stands and connectors
30. Pulleys
31. Carts
32. Wooden blocks
33. Light sources
34. Strobe light
35. Gyroscopes
36. Strings, and other supplies
37. Pith balls
38. Glass ware
39. Tuning forks
40. Set of balls
41. Sand
42. Computers
43. Oscilloscopes
44. Conducting paper

IV. Web site

- a. Web site is located at <http://www.curriculumalignment.ucf.edu>
- b. Login name is user's email address, and password is first letter of first name + last name + 1 (so Jane Jones would be jjones!). User name and email is all lower case.
- c. Click on the Physics link and then click on Log in to access the password protected section (need to mouse over Physics link and go to Physics Workspace).

V. Next Steps.

- a. Next meeting scheduled for October 7, 2012 at Valencia West
- b. Continue to work on the 5 goals and discuss conference scheduled for the end of October 2012

# Physics Curriculum Alignment

## Meeting Minutes

Friday October 7, 2011

10:00 a.m. to 2:00 p.m.

Valencia College

West Campus

### Present:

**Post-Secondary:** Xiaodi Chen – BCC; Erika Kisvarsanyi – CCF; Victor Bondzie, William Stillwell, Irina Struganova, Angela Cortes – VC; Gajendra Tulsian – DSC; Anthony Kondoleon – LSCC; Michael Hampton, Helen Hill, Pam Cavanaugh – UCF.

**Secondary:** Amber Morgan – Seminole County; Tricha Lewis – Villages Charter; Mike McKee – Orange County

### I. Welcome and introductions.

- a. Meeting started at 10:14 a.m. with introductions. The minutes of the previous meeting were reviewed.

### II. Further discussion on setting up an ideal lab was based on previous work and the suggested lap equipment list prepared by William Stillwell. The results of this discussion are presented here:

#### a. Major Lab Equipment

1. Lab Computers, laptop with storage cart and printer (1 for every 4 students)
2. laptop storage cart (1 total)
3. Interface (eg. Pasco 750, very flexible and multipurpose) (1 for every 4 students)
4. Sensors (#/computer) - motion (1), photogate pulley system with stand (2), force (2), T (2), P (2) voltage (2), current (2), Geiger counter (1), magnetic field (1), sound (1), 3-d accelerometer (1), light intensity (1),
5. Air track with air supply or dynamics cart and accessories (eg Pasco sf-9214,9216) (1 for every 4 students)
6. Ballistics pendulum including photogate mount and TOF accessory (1 for every 4 students)
7. Complete rotational system (1 for every 4 students)
8. Triple output DC power supply, eg B&K Precision (1 for every 4 students)
9. High speed video camera (1 total)
10. Digital mass scale (1 for every 4 students)

11. Laser, mountable He/Ne (1 for every 4 students)
12. Introductory optics system, including rail, lenses, mirrors, light source, etc (1 for every 4 students)
13. Heat engine/gas law apparatus (for AP) (1 for every 4 students)

**b. Less Expensive Lab Equipment, <\$250**

1. Digital multimeter, eg Fluke 175 (1 for every 4 students)
2. Spring set (1 for every 4 students)
3. Hot plates (1 for every 4 students)
4. Solar digital caliper, eg. Mitutoyo (1 for every 4 students)
5. Mass with hanger sets (1 for every 4 students)
6. Meter sticks (1 for every 2 students)
7. Stop watches (1 for every 4 students)
8. Mechanical wave driver (1 for every 4 students)
9. Spring scales, variable range, (set of 4 for every 4 students)
10. Variety of clamps (1 set for every 4 students)
11. Ring stands (1 set for every 4 students)
12. Electronics components (eg bread boards, resistors, capacitors, etc) (1 set for every 4 students)
13. Safety equipment, goggles, laser protection, etc (1 for every student)
14. Tuning forks and mallets (1 set for every 4 students)
15. Pulleys and string (1 set for every 4 students)
16. Slinkys (1 for every 4 students)
17. Electrostatics kits (1 for every 4 students)

**c. Demonstration equipment**

1. Van de Graff Generator
2. High voltage power source and gas discharge tubes

**d. Consumable experimental Supplies**

1. Cups,, tape, batteries, fishing line, etc. budget needed, \$100/25

**III. Additional discussion regarding lab equipment needs**

- a. Target large major pieces of equipment that can be used for large projects and request money for smaller things.
- b. Computers with related software and sensors for dedicated labs
- c. Air tracks and air supply
- d. Need for Math knowledge as foundation for understanding
- e. Define sets of equipment for use by student groups

- f. Differences in classroom numbers make it difficult to make standardized sets
- g. Taylor recommendations to number of students per set so all schools will be on same footing (4 per set)
- h. How are activities aligning with State Standards and how do we funnel information for change in standards with proper justification?
- i. Standards are set with little or no budget to support materials to teach.
- j. Training on equipment must be considered
- k. Reference national AAPT.org for standards information
- l. Current standards might be regular or AP
- m. Be aware of how our list measures up to the state standards – do we go above or stay within

#### **IV. Review of five goals**

- a. Discussion regarding how to address goals #3, 4 and 5.
- b. It was decided to defer #3 on Improving Public Relations and seek to further clarify what is needed.
- c. There was general consensus that #2 on Clear Communication between K-12, colleges, and FDOE was accomplished with the assignment by FDOE on Physics that was done and continues.
- d. More coordination on #4 could help the region and its students on opportunities that are happening. Examples mentioned include JETS (Junior Engineering Technical Society), SECME, and Science Olympiad (the national competition that will be held at UCF 5/18-19/2012).
- e. It was suggested to better utilize the web resources, including the calendar feature.
- f. More UCF departmental participation was suggested.
- g. Still need discussion on how to bring in middle schools with their emphasis on general Physical Sciences.

#### **V. Report and Conference Planning**

- a. Mike McKee agreed to be the moderator at the conference for the breakout sessions . A recorder will be identified.
- b. A report will be distributed to the group for feedback to prepare the annual report for the conference.

#### **VI. Next Steps**

- a. Next meeting is tentatively scheduled for February 3, 2012 at UCF.

## CURRICULUM ALIGNMENT: MATH

**May 2006** - A Working Group comprised of the Chief Academic Officers from UCF's six partner community colleges and key UCF administrators met and choose Math as the first subject to begin working on common course alignment. The primary objective is to improve student success for transferring students.

**September 2006** - Nearly 25 math faculty from Brevard Community College, Central Florida Community College, Daytona Beach Community College, Lake-Sumter Community College, Seminole Community College, Valencia Community College and UCF met and choose MAC 1105, MAC 1114 and MAC 1140 as the three courses to focus on. The objective is to align curriculum between and among institutions.

**January 2007** - Faculty from all seven institutions attended a half-day Workshop and compared their respective math course content, student learning outcomes and share best practices. They agree more work needs to be done regarding course alignment and will meet again in the fall of 2007. In addition, UCF math faculty gathered input from the six community colleges regarding MAC 1140, and as a result offered MAC 1140 in fall of 2007 for the first time.

**September 2007** - A representative from the Florida Department of Education State Course Numbering System gave a presentation to the faculty and stated the regional initiative to align curriculum is far ahead of the Department's statewide attempt at the same process. Faculty discussed specific learning outcomes for MAC 1105, MAC 1114 and MAC 1140, and will take the information back to their respective institutions and share with colleagues. Best practices and giving examples of teaching aides and showing various textbooks used in class were also addressed. Faculty will meet in early 2008 and focus on student contact hours for each of the three courses.

**February 2008** - Nearly 20 faculty representing all seven institutions gathered to compare student contact hours for MAC 1105, MAC 1114 and MAC 1140. Although generally the same, there were a few differences that were discussed with explanations regarding the number of hours spent on each area. Faculty agreed to take this information back to their respective institutions and share with colleagues. Best practices were discussed and information shared among participants. The next meeting in fall 2008 will focus almost entirely on learning outcomes for MAC 1105 and MAC 1140 and will compare them by institution. The goal is for the group to agree on a single set of learning outcomes for each course.

**October 2008** - The math faculty met at Valencia Community College's Criminal Justice Institute for this fifth meeting. The focus of the group was to clearly define the information to be covered in MAC1105, and MAC1140. The group went through each topic that is specified by all of the colleges and identified those topics that were mandatory, those that were overview, those that were optional, and those that were review. The faculty then discussed how they would implement these changes to the courses so that alignment could take place successfully. The group agreed to meet again in April 2009 to finalize learning outcomes for MAC1105 and 1140 and to start discussing alignment for trigonometry

**April 2009** - First, learning outcome assessment was tackled by the group. The group then discussed specific ways in which they assessed the learning outcomes that are tied to MAC1105 and MAC1140. The following items were introduced by the group participants during this time. Next, the group went through MAC1114 Trigonometry and agreed to the major topics to be covered and included in the



course (see excel spreadsheet). The group used the same identifying system of M for mandatory coverage, V for overview, R for review, and O for optional.

**October 2009** - First, the group discussed best practices for Trig (MAC 1114). Next, online examinations were discussed, particularly how UCF handles testing. Then, the group went through MAC2311 Calculus I and agreed to the major topics to be covered and included in the course (see excel spreadsheet). The group used the same identifying system of M for mandatory coverage, V for overview, R for review, and O for optional. On the next page is the table listing the results of this effort.

**February 2010** - The group discussed the idea of a “best practices” conference for the fall of 2010. All in attendance were in favor of such a conference. The group then spent the majority of the time covering the major topics and sub-topics for Calculus II and III. The topic list was reduced and combined to make a shorter and more relevant list.

### **September 2010**

The group started out the meeting with a discussion of early and late transcendentals for both Calc I and Calc II. They then made some changes to Calc I and II course content. Next, they briefly discussed the need to align Business Calculus and discussed the possibility of aligning Differential Equations at a future meeting. They then spent time looking at Liberal Arts math MGF 1106 and 1107 and covered the major topics for both courses. Then they proposed for 1107 that the first 2 topics should be mandatory, and then select 3 topics from the remaining sections listed. Lastly, faculty from engineering, biology, and chemistry discussed with the group the math skills that are needed in their respective areas.

### **February 2011**

The meeting was held at UCF in Partnership II. The group discussed the five goals from the October Conference. The group then aligned MAT 1033 – Intermediate Algebra, and the group looked at STA 2023 Elementary Statistics. Lastly, the group discussed the issue of the top-down approach to math education from the state.

### **October 2011**

Discussion focused on review of MAT 1033 and how the state mandates affect coverage of content issues and testing. This provided for introduction of Tammy Muhs, General Education Coordinator, UCF Math Department, and state representative for Math on PARCC (Partnership for Assessment of Readiness for College and Careers). Tammy was on the Academic Diploma Project sponsored by ACHIEVE and that looked at Math students and testing issues. She helped us recognize that the Common Core State Standards are currently being used as the foundation for course development and testing benchmarks. Further, there was review of STAT 2023. A final report of activity from the year will be provided at the upcoming conference.

**Goals with Tasks**  
**Math**  
**From Curriculum Alignment Conference**  
**October 27, 2010**

1. Continue and initiate more dialogue between high school and college levels.
  - a. Implement local networking opportunity to continue dialog between high school and college.
  - b. Identify and establish two to three local contacts and build a list serve for all to see.
2. Provide constant communication of course descriptions and ongoing assessments between levels.
  - a. Use curriculum alignment website to display the colleges' curriculum and a link to the DOE standards database.
  - b. Notify different levels of changes in assessments to include a timeline of upcoming assessments on the website.
3. Discuss and align placement process from secondary to post-secondary (6-20).
  - a. Collect information on college placement exams.
  - b. Update high school teachers on college placement exams.
4. Develop a consistent alignment of concepts taught and tools used in the K- 20 levels.
  - a. Define the minimum working knowledge to be successful at college algebra.
  - b. Action Items
  - c. Transfer this information to the public schools.
  - d. List on the website calculator usage at the colleges.
  - e. List on the website calculator usage on state End of Course exams (EOC) and required by benchmarks.
5. Share data to modify instruction to achieve desired learning outcomes.
  - a. Identify what data is available from the schools and colleges.
  - b. Analyze the data.
  - c. Develop a plan of next steps

# **Math Curriculum Alignment Workshop Minutes**

## **UCF, Partnership II**

**February 11, 2011**

### **In Attendance:**

**Post-Secondary:** DeAnn Bohm, Linda Parrish (BCC); Kirby Brown, Michael Jamieson (CCF); Marc Campbell, Natalie Weaver (DSC); John Shea, Sybil Brown, Thom Kieft (LSCC); Tony Malaret (SSC); Lori Dunlop-Pyle (UCF); Michael Hampton, Helen Hill, Craig Tidwell (UCF Admin).

**Secondary:** Ann Marie Hubscher (Brevard County); Veronica Yates-Riley (Orange County); Lisa Greco, Lisa Tindall, (Osceola County); Aglaia Christodoulides, Rebecca Devor, Melanie Howard-Miller, Sharon Shrader (Seminole County); Laura Strickland (Sumter County); Mary Ann Robertson (TVCS); Debbie Beavers, Margaret Bambrick (Volusia County); Greg Pink, Dee Ann Wilson (Lake County).

### **I. Welcome and introductions**

- a. Meeting started at approximately 10:00am
- b. Craig welcomed the group explained the purpose of curriculum alignment and had participants introduce themselves and what they do

### **II. Review of Past Meeting**

- a. Reviewed the minutes from the Sep 2010 meeting
- b. The group decided that instead of looking at College Algebra to align, they would instead focus on intermediate algebra (MAT 1033)

### **III. The 5 goals from the Curriculum Alignment Conference**

- a. Mike Hampton covered the 5 goals that were created at the conference and discussed how these goals would be the driving influence for the math group until the next conference in late October, 2011.
  - i. Discussion ensued regarding testing, and most students entering the college level were testing into intermediate algebra and not college algebra.
  - ii. The Success Academics initiative was brought up by Marc Campbell, a statewide initiative.
  - iii. Lots of discussion took place regarding Intermediate Algebra.
  - iv. There was mention that Algebra II will be required for all high school students in the next few years as students will be required to take 4 years of mathematics

- v. There was discussion on the issue of placing too much focus on content rather than on process. This impacts depth and width of topics covered and how they are covered.
  - vi. Math for College Readiness was discussed and the standards were distributed to the group. Bill 1908 enables students to skip MAT1033 if they pass the placement exam at a prescribed level.
  - vii. Daytona had approximately 87 students take the College Readiness math course and none of them passed the CPT test .
- b. The group then aligned the topics for MAT 1033 – Intermediate Algebra in detail (see next pages).
- c. Next, the group looked at STA 2023 – Elementary Statistics and outlined the major topics and sub topics covered. Will look at the course in more detail at the next meeting in September (see next pages).
- d. Lastly, there was a discussion regarding the top-down approach to math education from the state.
  - i. Have to fit instruction and material within mandates.
  - ii. Colleges need to align cut scores so that they are the same.
  - iii. More consistency is needed among the colleges.
  - iv. P.E.R.T. exam tests to College Algebra – top down again.
  - v. There was a lot of discussion about consistency issues between schools.

#### **IV. Next steps**

- a. Look at statistics in more detail
- b. Re-visit MAT 1033
- c. Look at depth and timing from previous courses
- d. Invite a state representative to be involved in the next meeting
- e. Meeting will be held on Friday, September 30, from 10am – 2pm
  - i. Location to be determined

MAT 1033 Course Content	MAT 1033 Course Topics - Intermediate Algebra (Math for College Readiness at the secondary level)	Course Topics M = Mandatory, O=Optional, R=Review, V=Overview
Linear Equations	ID linear equations	R
	Systems	M
	Solve	R
	Graph 2 dimensional	R
	Applications	R
	Literal equations	R
	Absolute value	M
	Write the equation	M
Inequalities	Point-slope, standard form, slope-intercept	M
	Solve 1-dimensional	R
	Solutions: line graph, set builder notations, interval notation	M
	Graph 2-dimensional	M
	Rational	O
	Absolute value	O
Intro to functions	Quadratic	O
	Library of basic functions - linear, quadratic, cubic, rational, cube root, square root, absolute value	V/O
	ID a function	M
	Notation	M
	Domain and range	M
	Composite	O
	Graph	M
	Evaluate	M
Factoring	Numbers	R
	Binomials, Trinomials	R
	GCF and LCM	R
	Grouping	R
	Sum and difference of cubes	M
	Difference of squares	R
Algebraic fractions	Complex	M
	Domain	M
	Arithmetic operations	M
	Simplify	M
Rational equations	Identify	M
	Literal equations	M
	Solve	M
	Applications	M
	Domain	M
Radicals and Radical Equations	Solve equations	O
	Domain	M
	Evaluate	M
	Simplify	M
	Perform arithmetic operations	M
Rational exponents	Properties and meanings	M
	Converting between rational and radical form	M
	Operations	M
	Evaluations	M
Complex numbers	Standard form	M
	Conjugate	M
	Arithmetic operations	M
	Identify real vs imaginary	M
Quadratic equations	Solve: Square root property, completing the square, quad formula	M
	Solve by factoring	R
	Solve by graphing	O
	Interpret graphs	M
	Identify	M
Exponents	Properties and meanings	R
	Simplify	R
	Scientific notation - arithmetic operations; converting	O/R
Polynomials	ID and Classify	R
	Vocabulary - degree, coefficient, constant, variable, term, exponent, base, literal part, etc.	R
	Arithmetic Operations	R
	Evaluation	R

STA2023	Elementary Statistics	M = Mandatory, O=Optional, R=Review, V=Overview
Central Tendency	Mean Mid-range Skewness Median Mode	
Dispersion	Range Standard Deviation/Variance Empirical rule Chebyshev's Theorem Percentiles, Quartiles Coefficient of variation Range rule of thumb	
Probability	Addition rule Multiplication rule Conditional rule Independence Contingency tables Mutually exclusive Combinations and permutations	
Statistical Design and Research	Sampling techniques Types of studies Types and level of data Vocabulary	
Confidence Intervals	About a mean About a proportion	
Hypothesis Testing	Means Proportions Regression/correlation parameters	
Linear Regression	Line of best fit	
Discrete Random Variables	Probability distribution Cumulative distributions Binomial	
Normal Distribution	Z scores Central Limit Theorem T scores Application	
Summarizing and Graphing Data	Ditto	

# Math Curriculum Alignment

## Meeting Minutes

October 21, 2011

UCF Partnership II

### In Attendance:

**Post-Secondary:** Allan Danuff, Kirby Brown, Michael Jamieson (CCF); Thom Kieft, Nancy Parks (LSCC); Tony Malaret, Tess Creel, Lane Vosbury (SSC); Lori Dunlop-Pyle, Tammy Muhs, Constance Schober, Joseph Brennan, Michael Hampton, Pam Cavanaugh (UCF); Lisa Cohen (VC).

**Secondary:** Greg Cross (Brevard County); Aglaia Christodoulides, Rebecca Devor, Sharon Shrader (Seminole County); Hal Pohill, Paula Lindsey, Laura Strickland (Sumter County); Mary Ann Robertson (TVCS); Margaret Bambrick (Volusia County).

### **I. Welcome and introductions**

- a. Meeting started at 10:10am and Mike welcomed the group and introduced Pam Cavanaugh as new to the UCF team and our Curriculum Alignment efforts. Mike had everyone introduce themselves and reviewed the agenda for the meeting.

### **II. Review of Past Meeting**

- a. Reviewed the minutes from the February 2011 meeting and highlighted the goals from the Curriculum Alignment Conference that will need to be addressed in the report from this group at the upcoming conference on October 28.

### **III. Look at Statistics in more detail**

- a. Statistics review was suggested to be deferred until someone from the Statistics department could be present. Tom Kieft who is LSCC Department Chair and teaches Statistics offered guidance for the review.
  - i. Great discussion ensued regarding content topics. It was suggested that this review be further reviewed by UCF and/or FDOE.
  - ii. The review generated the attached content areas with designations for mandatory, optional, review and overview for each topic area.
  - iii. There was discussion on the issue of placing too much focus on content rather than on process. This impacts depth and width of topics covered and how they are covered.

### **IV. Re-visit MAT 1033**

- a. The group then reviewed the alignment work on topics for MAT 1033 – Intermediate Algebra that was initially done in February.
- b. Lots of discussion surrounded what FDOE and Race to the Top is doing with end of course testing mandates and the effects of this on topics that this alignment process identifies as important for preparation, transition and success.
- c. Additional issues of placement into MAT 1033 were discussed.

- d. In looking at the Statewide Course Numbering System, suggested topics for coverage in MAT 1033 tend to be loosely defined yet Sunshine State Standards more specifically define what is required.
- e. Discussion continued about end of course testing and the state work on Bill 1908 and related bills effecting high school courses (Developmental Math & College Readiness Math) and issues with “cut scores” and college readiness testing.
- f. At this time, it was suggested to adjust the agenda to include Tammy Muhs, General Education Coordinator ([Tammy.Muhs@ucf.edu](mailto:Tammy.Muhs@ucf.edu)) UCF Math Department, and state representative for Math on PARCC, Partnership for Assessment of Readiness for College and Careers (<http://parcconline.org/>).
- g. While PARCC is the 24-state consortium working on assessment, the Common Core State Standards (<http://www.corestandards.org/>) that 45/50 states have adopted is the foundation for what students are expected to learn. Mathematics standards are included [http://www.corestandards.org/assets/CCSSI\\_Math%20Standards.pdf](http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf)
- h. Tammy provided a historical view of how Sunshine State Standards and College and Career Readiness were a phase but the current use of Common Core State Standards is now being used.
- i. The Academic Diploma Project sponsored by ACHIEVE looked at math students and testing issues.
- j. PERT was discussed as the Florida state test recognized as determining whether a student needs remediation. There is discussion on how this will continue with PARCC as it becomes the assessment arm for Race to the Top. Math is intended to be fully online testing and full implementation is targeted for 2014. Decisions are still being made with transition plans identified by initially including 8<sup>th</sup> grade as indicated in this recent presentation by the Office of Assessment (FDOE) on October 10-12 (<http://fcad.fldoe.org/pdf/f2rma1eassrdwp.pdf>).
- k. The resounding question is “what can we do now to prepare for this?” This may be the direction for this group and an opportunity for discussion at the upcoming conference.
- l. Discussion went back to MAT 1033 with minor changes to content areas (attached)
- m. Constance Schober from the UCF Math Department addressed the group with an idea to develop an Academic Support group for Math transfer students since the majority of Math students are transfers. Please contact her at [Constance.Schober@ucf.edu](mailto:Constance.Schober@ucf.edu) or by phone at 407-823-0147 if you are interested in partnering with her.

## **V. Next steps**

- a. Curriculum Alignment Conference is next week, October 28 at Valencia’s CJI from 9-4.
- b. The Math Curriculum Alignment report will be delivered at the conference.
- c. Our moderator will be Lori Dunlop-Pyle with Mike Jamieson’s assistance.
- d. Our next meeting will be on February 24, 2012. Math will meet in the morning and we will be meeting with Chemistry in that afternoon to begin cross disciplinary discussions. It will be hosted at UCF.



MAT 1033 Course Content	MAT 1033 Course Topics - Intermediate Algebra (Math for College Readiness at the secondary level)	Course Topics
		M = Mandatory, O=Optional, R=Review, V=Overview
Linear Equations	ID linear equations	R
	Systems	M
	Solve	R
	Graph 2 dimensional	R
	Applications	R
	Literal equations	R
	Absolute value	M
	Write the equation	M
	Point-slope, standard form, slope-intercept	M
Inequalities	Solve 1-dimensional	R
	Solutions: line graph, set builder notations, interval notation	M
	Graph 2-dimensional	M
	Rational	O
	Absolute value	O
	Quadratic	O
Intro to functions	Library of basic functions - linear, quadratic, cubic, rational, cube root, square root, absolute value	V/O
	ID a function	M
	Notation	M
	Domain and range (including Practical)	M
	Composite	O
	Graph	M
	Evaluate	M
Factoring	Numbers	R
	Binomials, Trinomials	R
	GCF and LCM	R
	Grouping	R
	Sum and difference of cubes	M
	Difference of squares	R
		M
Algebraic fractions	Complex	M
	Domain	M
	Arithmetic operations	M
	Simplify	M
Rational equations	Identify	M
	Literal equations	M
	Solve	M
	Applications	M
	Domain	M
Radicals and Radical Equations	Solve equations	O
	Domain	M
	Evaluate	M
	Simplify	M
	Perform arithmetic operations	M
Rational exponents	Properties and meanings	M
	Converting between rational and radical form	M
	Operations	M
	Evaluations	M
Complex numbers	Standard form	M
	Conjugate	M
	Arithmetic operations	M
	Identify real vs imaginary	M
Quadratic equations	Solve: Square root property, completing the square, quad formula	M
	Solve by factoring	R
	Solve by graphing	V
	Interpret graphs	M
	Identify	M
Exponents	Properties and meanings	R
	Simplify	R
	Scientific notation - arithmetic operations; converting	O/R
Polynomials	ID and Classify	R
	Vocabulary - degree, coefficient, constant, variable, term, exponent, base, literal part, etc.	R
	Arithmetic Operations	R
	Evaluation	R

<b>STA2023</b>	<b>Elementary Statistics</b>	<b>M = Mandatory, O=Optional, R=Review, V=Overview</b>
Central Tendency	Mean Mid-range Skewness Median Mode	MR MR M R MR
Dispersion	Range Standard Deviation/Variance Empirical rule Chebyshev's Theorem Percentiles, Quartiles Coefficient of variation Range rule of thumb	MR M M V M M M
Probability	Addition rule Multiplication rule Conditional rule Independence Contingency tables Mutually exclusive Combinations and permutations	M M M M M M M
Statistical Design and Research	Sampling techniques Types of studies (observational vs. experiment; blind/double blind) Types and level of data Vocabulary	M M M M
Confidence Intervals	About a mean About a proportion	M M
Hypothesis Testing	Means Proportions Regression/correlation parameters	M M M/O/V?
Linear Regression	Line of best fit	M?
Discrete Random Variables	Probability distribution Cumulative distributions Binomial Poisson distribution	M M M O
Normal Distribution	Z scores Central Limit Theorem T scores Application	M M M M
Summarizing and Graphing Data	Ditto Frequency Histograms Box plots	M M M M